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Changes in the Manufacturing Economy of the Southwest Between 1939 and 1947

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Much has been written in recent years with regard to the industrialization of the South, and particular attention has been devoted to the area known as the Gulf-Southwest. Numerous attempts have been made to determine the extent of industrial progress in these areas; however, until the 1947 Census of Manufacturing was released, there was no complete inventory that would reveal the nature of recent gains. Since this 1947 Census of Manufacturing is the first since 1939, in a sense, it reveals the progress made during the wartime decade. However, the results of this Census cannot be taken to indicate the extent of wartime industrial activity, for the 1939 Census was taken during the early years of our national defense program, and two years or more before we entered the war. The 1947 census came almost two years after the war was over, and this two-year period allowed sufficient time for industrial cutbacks and relocation. For this reason, distortions in normal trends should be minimized.

Using the same sources of information, various writers often indicate different degrees of industrialization for the same region. This is true because there is no commonly accepted measure of industrialization. Statistics based upon the increase in the number of manufacturing concerns will yield one result. Data based upon the number of workers employed in manufacturing will reveal different results. If results are based upon the value of materials used in manufacturing, or the value of the output, or the value added by the manufacturing processes, still other results are shown. All of these measures reveal industrial progress, but because of the varying pattern of industrial development within the several areas of the country, it is difficult to choose the one that is the best measure. These barometers of industrial activity do not move in the same direction nor to the same extent. Rather than selecting a single measure of industrial activity, this paper attempts to analyze several of the most important ones so that more comprehensive conclusions may be formed.

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No attempt will be made to justify the selection of the particular states included as the Southwest. The region selected is the one designated by the United States Census as the West South Central States; it is composed of Arkansas, Louisiana, Oklahoma, and Texas. These states, usually referred to as the Southwest, make up that area of the South which is west of the Mississippi River. It does not include the Mountain or Pacific Southwest.

The number of manufacturing establishments in the Southwest increased between 1939 and 1947 at the same rate as did the number for the nation as a whole. This average increase of 38.6% for the nation and the Southwest was exceeded by two of the four states included in the region, while the other two states fell below that average increase. Arkansas, which had recorded the smallest number of manufacturing concerns in 1939, showed the highest percentage increase. Arkansas' increase of 72.6% was almost twice the rate of increase recorded by Texas, the other state that exceeded the national average. Manufacturing establishments increased 40.2% in Texas, 34.3% in Louisiana, and 13.7% in Oklahoma. Oklahoma's rate of increase was below that of any other Southern state. In spite of the publicity given to the industrialization of the Southwest, this region's manufacturing concerns increased only 38.6% between 1939 and 1947 as compared to an increase of 49.9% for the entire Southern area.¹ With these changes in the number of establishments, the Southwest continued to have 5.5% of the nation's manufacturing firms as had been the case in 1939. On the other hand, the South increased its proportion of the total from 16.4% in 1939 to 17.7% in 1947.

In terms of the number of production workers employed rather than the number of firms, industrial gains in the Southwest present a much different picture. While manufacturing workers in the United States increased 52.6% between 1939 and 1947, and those in the South grew 49.9%, production workers in the Southwest increased 76.2%. All of the states in this area showed increases that were larger than either the average for the South or for the nation. The rates of increase varied among the Southwestern states from 58.3% in Louisiana to 93.4% in Texas. In spite of these above-average increases in manufacturing workers, this region in 1947 contained only 3.8% of the nation's workers as compared to its 5.5% of manufacturing firms. In 1939, its share had been only 3.3% of the nation's production workers. This means that the average size of manufacturing firms in the Southwest, in terms of the number of production workers employed, increased between 1939 and 1947 at a more rapid rate than for the nation. However, in 1947,

¹The thirteen states of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, Tennessee, and Kentucky.

after these changes had occurred, the average number of workers per concern was below the national average, and the average for the South as a whole.

Total wages paid to workers in manufacturing within a state or an area can increase as a result of change in the number of workers or as a result of changes in wage levels. Although the number of workers in manufacturing in the Southwest increased 76.2% between 1939 and 1947, the total wage bill increased 323%. Increases for the nation and the South during this same period were 236% and 273%, respectively. All states in the Southwest had increases in their manufacturing wage bill that exceeded the national increase; rates of increase among the individual states varied from 251% in Oklahoma to 342% in Texas. While these gains increased the proportion of the national manufacturing wage bill paid to workers in the Southwest from 2.6% in 1939 to 3.3% in 1947, the region accounted for a smaller proportion of the nation's wages than it did of the nation's manufacturing workers. However, the disparity between its 3.8% of total workers and 3.3% of the total wage bill was not as large, proportionately, as was true for the South as a whole. The South, in 1947, had 17.0% of all manufacturing workers in the nation, but received only 13.1% of the nation's wage bill.

Probably the best measure of the value of manufacturing to the economy of any region is "value added by manufacture." Value added is the difference between the value of the final product and the costs of materials and power used. Value added is the determinant of the industry's ability to pay its workers, its overhead, its selling costs, and to realize a profit from the process. Since value added by manufacture is expressed in money, a substantial increase in this value is expected between 1939 and 1947, due to changes in the price level.

The value added by manufacturing in the Southwest in 1947 was 271% greater than in 1939. This increase was significantly larger than that shown by the entire South, while the increase recorded by the South was considerably greater than the one for the nation. The South and Southwest, as well as each state in the Southwest, accounted for a larger proportion of the nation's value added by manufacture than of the nation's wage payments. Between 1939 and 1947 the Southwest increased its share of national manufacturing productivity from 3.4% to 4.1% of the total. Arkansas recorded the greatest percentage increase in value added for any one state, 299%; Oklahoma's increase of 235% was the smallest and fell below the all-South average of 245%.

Among the states in the Southwest, average annual wages per worker in manufacturing in 1939 ranged from \$678 in Arkansas to \$1,087 in Oklahoma. The average for the Southwest of \$908 per worker was above the all-South figure of \$790 but below the national average of \$1,152.

By 1947, the average wages per worker (expressed in current dollars) had more than doubled in the Southwestern states. The percentage increase was smallest in Oklahoma and largest in Louisiana, but the relative standing of the four states in this respect was the same as in 1939. Average wages per worker of \$2,377 placed Oklahoma in the first position, followed by Texas, Louisiana, and Arkansas. The average increase of 140% in money wages per worker in the Southwest exceeded the nation's increase of 120%, but was short of the increase of 149% shown by the South.

Actually workers in manufacturing have not improved their status nearly to the extent the percentage increases in wages would indicate. When adjustments are made for changes in the value of money, the increase in wages per worker is greatly reduced. Since all of the wage data are adjusted by the same price index, no change is made in the position of the several states. The percentage increase in wages for the nation is reduced from 120% to 38%, for the South from 149% to 55%, and for the Southwest from 140% to 50%.² This increase in the average wage per worker in the South and Southwest (after adjustments for changes in the price level) at a rate exceeding the nation's rate is further evidence that the former North-South wage gap is rapidly closing.

The proportion of value added by manufacture going to workers in the form of wages in the Southwest was below the percentage in the South and the United States. This was true both in 1939 and 1947. In 1939 an average of 28.7% of the difference between the value of raw materials and the value of the final product was paid as wages in the Southwest; this can be compared to 34.1% for the entire South and 36.7% for the nation. In that year, this proportion varied among the Southwestern states from 27.1% in Louisiana to 36.4% in Arkansas. By 1947, the proportion of value added going to labor had increased in all of the Southwestern States, but also in the nation as a whole. This proportion in the Southwest (32.9%) was still below the all-South figure (36.9%) and the figure for the nation (40.6%). In 1947, Louisiana had moved from fourth to second, in this respect, among the Southwestern States. It should be pointed out that the relationship between wage bill and value added does not necessarily reflect wage levels. The nature of the manufacturing process is the major determinant of this relationship. In the Southwest, where there are many petroleum and chemical industries requiring elaborate plants that use relatively small labor forces, it is expected that the percentage of the total productivity in the manufacturing process going to labor would be less than in areas where other types of industries are found.

²Adjustments based upon the Bureau of Labor Statistics Consumers' Price Index.

The importance of manufacturing to the economy of any area is indicated by the portion of total income payments accounted for by manufacturing wages. If wage payments to workers in manufacturing are compared with total income payments to individuals, it is found that for the nation these wages made up 12.7% of total income in 1939 and 16.0% in 1947. These proportions are considerably above the all-South percentages of 9.1% and 10.8% for 1939 and 1947. In the Southwest these proportions fell far below both the national and the all-South averages in 1939 and 1947. In 1947, among the individual states, the part of total income payments coming from manufacturing wages varied from 4.8% in Oklahoma to 9.9% in Louisiana. In other words, if the relationship between manufacturing wages and total income within the region is used as a criterion of the degree of industrialization, the Southwest is still not nearly as industrialized as the South and the nation.

One of the outstanding features of the recent industrial expansion that has occurred in the Southwest is the change in the composition of the region's industry. As in the remainder of the South, manufacturing in the Southwest has consisted principally of those industries (e.g., lumber, food processing, and apparel) which employ largely unskilled labor, involve a small capital investment per worker, and have a low value added and low value of product per worker. Industries involving more advanced processing of materials, more skilled labor, more capital per worker, and producing greater value added per worker have constituted only a small portion of the industry of the Southwest and, in the past, have expanded very slowly. Petroleum refining is the one exception to this generalization. Between 1939 and 1947, expansions in this more productive type of industry (referred to hereafter as high-value-added industries)* were significant on both a percentage and an absolute basis.

Employment in the high-value-added industries of the Southwest increased 143.4% compared with an increase of only 76.2% for all industries in the region. Out of a total increase in production workers of 197,200 for all industries, the high-value-added industries accounted for 100,100 or 50.8% of the absolute expansion. Value added in this type of industry increased 354.9% compared with an increase of only 271.4% for all industries. Out of a total expansion of \$2,212,400,000 in value

*The following industry groups found in the Southwest are made up of industries which generally involve a large investment per worker and produce a relatively high value added per worker: chemicals and allied products, petroleum and coal products, primary metals, fabricated metal products, machinery (except electrical), electrical machinery, transportation equipment, and instruments and related products. Other groups such as paper and allied products and the printing and publishing industries could be added to this list but calculations based upon the above groups only are used in this paper to indicate the change in importance of this type of industry in the Southwest.

added, \$1,169,800,000 was accounted for by the high-value-added industries. This was 52.9% of the absolute increase.

These developments have brought a marked increase in the importance of such industries to the region. Production workers in the high-value-added industries increased from 27% of the region's production workers in 1939 to 37.3% in 1947. Value added in these industries increased from 40.4% of the total for all industries in 1939 to 49.5% in 1947.

Because of the larger capital investment required per worker, the high-value-added industries provide less additional employment than similar investments in industries with a lower investment per worker. However, the high-value-added industries would seem more likely to meet the need of the Southwest for higher per capita incomes and for the development of skilled labor. In the long run this type of industry is likely to contribute more to the economic development of the region.

Changes in the major industry groups of the Southwest between 1939 and 1947 further emphasize the extent of the change in the composition of the region's industry. In terms of employment the eight major industry groups of the Southwest in 1939 were, in order of importance: (1) lumber and products, except furniture; (2) food and kindred products; (3) petroleum and coal products; (4) apparel and related products; (5) chemicals and allied products; (6) printing and publishing industries; (7) textile mill products; and (8) machinery (except electrical).

In terms of value added the first eight were, in order of importance: (1) food and kindred products; (2) petroleum and coal products; (3) lumber and products, except furniture; (4) chemicals and allied products; (5) printing and publishing industries; (6) machinery (except electrical); (7) stone, clay, and glass products; and (8) paper and allied products. The first list includes only three high-value-added industries, petroleum and coal products, chemicals and allied products, and machinery (except electrical). The second list includes these same three plus paper and allied products.

In 1947 the first eight industry groups in the Southwest in terms of employment were: (1) lumber and products, except furniture; (2) food and kindred products; (3) petroleum and coal products; (4) chemicals and allied products; (5) apparel and related products; (6) transportation equipment; (7) machinery (except electrical); and (8) paper and allied products. In terms of value added, the list included the same groups, with one exception, printing and publishing industries instead of apparel and related products. Five high-value-added industry groups, petroleum and coal products, chemicals and allied products, transportation equipment, machinery (except electrical), and paper and allied products, are included in both lists. The transportation equipment group moved

from fourteenth position in terms of employment and twelfth in terms of value added in 1939 to sixth in employment and eighth in value added in 1947.

In terms of employment and value added, the rapid expansion of industry in the Southwest is reflected in the rates of expansion in the various industry groups. Employment in all but three of the Southwest's eighteen industry groups expanded more rapidly than employment in those industry groups in the nation. Production workers in twelve of the eighteen expanded more rapidly than employment in the same industry groups in the South as a whole. In most cases it was the low-value-added industries, especially food and kindred products, textile mill products, and lumber, in which expansion in the Southwest lagged behind.

In rate of expansion in terms of value added, the Southwest lagged behind the nation in only three industry groups, textiles, lumber, and machinery (except electrical). However, seven industry groups in the Southwest failed to expand as rapidly in terms of value added as the same groups in the South. Those industry groups having the greatest rates of expansion in the Southwest, as measured by number of production workers and value added were: instruments and related products, transportation equipment, leather and leather products, electrical machinery, primary metal, chemicals and allied products, fabricated metals, and machinery (except electrical).

Exceptional expansions occurred in a number of specific industries within the various industry groups. Examples include the pulp, paper, and paper board industry in which production workers increased from 7,613 to 13,197; the industrial inorganic chemicals industry in which production workers expanded from 1,420 to 5,355; the industrial organic chemicals industry in which employment increased from 750 production workers in 1939 to 10,975 in 1947; the petroleum refining industry in which production workers increased from 26,455 to 43,822; the structural metal products industry in which employment increased from 4,462 to 10,805; and the construction and mining machinery industry in which production workers increased from 7,304 to 14,174.

Despite large relative gains, the only industry groups in which the Southwest accounts for a significant share of total national production are petroleum and coal products and lumber and products (except furniture). The Southwest had 25.1% of the production workers and accounted for 23.3% of the value added in the petroleum and coal products group in 1939 and 27.2% of production workers and 28.7% of value added in 1947. In 1939, 14.8% of the production workers and 11.3% of the value added in the lumber and products group were in the Southwest. These ratios dropped to 14.4% and 10.8%, respectively, in 1947.

TABLE I
Changes in the Southwest's Manufacturing Economy, 1939-1947

NUMBER OF ESTABLISHMENTS		PRODUCTION WORKERS		PRODUCTION WAGES		VALUE ADDED BY MANUFACTURE	
NUMBER IN 1947	% CHANGE 1939-1947	NUMBER IN 1947 (THOUSANDS)	% CHANGE 1939-1947	AMOUNT IN 1947 (IN MIL- LIONS)	% CHANGE 1939-1947	AMOUNT IN 1947 (IN MILLIONS)	% CHANGE 1939-1947
Arkansas	1,924	72.6	58.3	\$ 101.9	321.1	\$ 265.1	299.3
Louisiana	2,389	34.3	111.6	229.7	321.5	694.1	249.7
Oklahoma	1,740	13.7	44.3	105.3	251.0	341.0	235.0
Texas	7,128	40.2	242.0	558.4	341.8	1,727.5	285.2
Southwest ¹	13,181	38.6	456.2	995.3	323.4	3,027.7	269.2
Entire South ²	42,752	49.9	2,022.1	3,973.5	273.0	10,761.7	244.5
Total United States	240,881	38.6	11,916.0	30,242.2	236.1	74,425.8	203.9

Source: *Census of Manufacturers, 1947*.

- (1) The four enumerated states shown above.
- (2) The thirteen states, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Texas, Oklahoma, Arkansas, Tennessee, and Kentucky.

The region has increased its share of production workers and value added in all those industry groups which have expanded faster in the Southwest than in the nation. Nevertheless in most cases, the Southwest's share of these industries is still less than five per cent.

Rapid relative expansions of manufacturing in the Southwest, in terms of all of the various measures of industrialization, have produced important increases in the amount of industry in the region and some increases in the region's share of the nation's industry. The Southwest may eventually become an important industrial area, if these improvements continue. However, tremendous additional expansions must occur. By any criterion available for measuring industrialization, the Southwest contained no more than 5.5% of the nation's manufacturing in 1947 but had approximately 9.7% of the nation's population. Further industrial expansion is necessary even to give the region its proportionate share of the nation's industry.

TABLE II

*The Percentage of Total United States Manufacturing
Located in the Southwest, 1939 and 1947*

	NUMBER OF ESTABLISH- MENTS		PRODUCTION WORKERS		WAGES TO PRODUCTION WORKERS		VALUE ADDED BY MANUFAC- TURE	
	1939	1947	1939	1947	1939	1947	1939	1947
Arkansas	.6	.8	.5	.5	.3	.3	.3	.4
Louisiana	1.0	1.0	.9	.9	.6	.8	.8	1.0
Oklahoma	.9	.7	.4	.4	.3	.3	.4	.5
Texas	2.9	3.0	1.6	2.0	1.4	1.8	1.8	2.3
Southwest ¹	5.5	5.5	3.3	3.8	2.6	3.3	3.4	4.1
Entire South ²	16.4	17.7	17.3	17.0	11.8	13.1	12.8	14.5

Source: *Census of Manufactures, 1947*

¹see table I

²see table I

TABLE IV

*Southwest¹ Production Workers and Value Added
by Industry Groups*

INDUSTRY GROUP ²	PRODUCTION WORKERS (THOUSANDS)		PER CENT OF U. S.		VALUE ADDED (MILLIONS \$)		PER CENT OF U. S.	
	1939	1947	1939	1947	1939	1947	1939	1947
Food	55.8	84.0	7.0	7.6	213.1	593.7	6.1	6.6
Textiles	11.3	11.7	1.0	1.0	15.5	43.5	0.9	0.8
Apparel	16.2	28.8	2.2	3.0	22.0	98.2	1.6	2.2
Lumber	62.4	85.9	14.8	14.4	82.5	269.6	11.3	10.8
Furniture	6.8	10.3	3.6	3.6	13.1	43.4	3.1	3.1
Paper	10.7	19.3	4.0	5.0	34.4	156.1	3.9	5.4
Printing	11.4	17.1	3.5	3.9	60.4	154.4	3.4	3.6
Chemicals	13.5	32.0	4.9	6.9	65.3	389.3	3.6	7.3
Petroleum	27.0	46.1	25.1	27.2	162.3	578.6	23.3	28.7
Leather	0.7	2.8	0.2	0.8	1.5	9.3	0.3	0.6
Stone, Clay, Glass	10.2	18.5	3.8	4.6	35.3	107.9	4.1	4.7
Primary Metal	5.5	17.1	0.8	1.7	12.0	96.1	0.6	1.7
Fabricated Metal	7.4	17.4	1.6	2.1	24.2	105.2	1.7	2.1
Electrical Machinery	0.6	2.0	0.2	0.3	2.3	14.1	0.2	0.4
Machinery (other)	11.2	25.2	2.1	2.0	48.0	175.4	2.4	2.2
Transport Equipment	4.4	28.0	0.8	2.8	15.1	132.7	0.9	2.3
Instruments	0.2	2.1	0.2	1.2	0.4	8.0	0.1	0.7
Miscellaneous	2.2	4.6	0.9	1.2	5.4	21.4	0.9	1.0

Source: *Census of Manufactures, 1947.*

¹See Table I.

²Industry group titles have been shortened for convenience.

TABLE V

*Changes in Production Workers and Value Added
by Industry Groups*

INDUSTRY GROUP ^a	PRODUCTION WORKERS PERCENTAGE CHANGE 1939-1947			VALUE ADDED PERCENTAGE CHANGE 1939-1947		
	SOUTH- WEST ¹	SOUTH ²	U.S.	SOUTH- WEST ¹	SOUTH ²	U.S.
Food	50.5	61.1	37.1	178.6	219.0	159.0
Textiles	03.5	16.2	06.1	180.6	277.2	193.8
Apparel	77.8	66.6	29.2	346.4	321.7	220.6
Lumber	37.7	47.2	41.0	226.8	247.9	241.5
Furniture	51.5	53.3	49.3	231.3	265.3	229.8
Paper	80.4	78.1	43.9	353.8	340.9	223.6
Printing	50.0	50.6	35.0	155.6	154.1	141.9
Chemicals	137.0	65.1	69.2	496.2	258.0	195.0
Petroleum	70.7	66.6	57.5	256.5	266.7	189.0
Leather	300.0	50.6	6.5	520.0	255.9	163.0
Stone, Clay, Glass	81.4	64.3	51.9	205.7	210.4	169.4
Primary Metal	210.9	69.5	50.2	700.8	172.7	165.8
Metal	135.1	97.0	82.3	334.7	288.0	251.3
Fabricated Electrical						
Machinery	233.3	164.7	157.8	513.0	414.1	313.6
Machinery (other)	125.0	159.1	132.1	265.4	321.5	283.5
Transport						
Equipment	536.4	206.6	81.3	778.8	382.2	231.1
Instruments	950.0	800.0	114.3	1900.0	1466.7	224.0
Miscellaneous	109.1	82.6	64.5	296.3	224.7	231.8

Source: *Census of Manufactures*, 1947.

¹See Table I

²See Table I

^aIndustry group titles have been shortened for convenience.